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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,448	11/14/2001	Richard D. Hale	99-441	6676

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EXAMINER

PEREZ DAPLE, AARON C

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 10/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/987,448

Applicant(s)

HALE, RICHARD, ET AL

Examiner

Aaron C Perez-Daple

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/14/01.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because Fig. 1 does not include labels and is not described in the detailed description of the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-21** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically the limitation “generating a globally optimized 3-D ply definition for a laminate part” recited in lines 2-3 of claims 1, 8 and 15 was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Although the specification refers to “generating a globally optimized 3-D ply definition” (pg. 9, paragraphs 3 and 4; 140, Fig. 3), the specification does not provide sufficient explanation nor support for the use of the term “globally optimized,” which term implies optimization over all system constraints. The Office notes that

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optimization over all system constraints is not achieved until the system has gone through one or more iterations, which is the purpose of using feedback in the claimed invention.

4. As dependent claims, claims 2-7, 9-14 and 16-21 suffer from the same deficiencies as their parent claims.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 1-21** are rejected under the second paragraph of 35 U.S.C. 112. Specifically, the term "globally optimized" in claims 1, 8 and 15 is a relative term which renders the claim indefinite. The term "globally optimized" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. See rejection under 35 USC 112 first paragraph above.

For the purpose of applying prior art, the Office interprets "generating a globally optimized 3-D ply definition" to mean "generating an optimized initial 3-D ply definition." This interpretation is supported by applicant's figure 3, which labels the "initial design" coming from element 150 after an initial optimization is performed by elements 140 and 150.

7. Claims 1-21 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claims 1, 8 and 15 recite the limitation "optimizing the 3-D ply definition." The Office points out that the 3-D ply definition is not fully optimized until the closed loop design system illustrated in Fig. 3 has completed one or more iterations. Furthermore, the 3-D ply definitions cannot be said to be optimized until the

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completion of the modification step recited as the limitation “modifying the 3-D ply definition.” Finally, applicant recites two “optimization” steps in a row (e.g. generating a globally optimized 3-D ply definition and optimizing the 3-D ply definition) and it is not clear what, if any, difference is intended between the two recited optimizations. Therefore, for the purpose of applying prior art, the Office interprets the limitation “optimizing the 3-D ply definition to mean, “analyzing the 3-D ply definition.” This interpretation is supported by applicant’s figure 3.

8. As dependent claims, claims 2-7, 9-14 and 16-21 suffer from the same deficiencies as their parent claims.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, 21** are rejected under 35 U.S.C. 102(b) as being anticipated by Morelle et al (Patrick Morelle, R. Radovic, “CAD based optimization of composite structures,” Proceedings of Sixth Int. Conference on OPTI, March 16-18, 1999, pgs. 311-320.) (hereinafter Morelle).
11. As for claims 1, 8 and 15, Morelle discloses a composite design optimization process, apparatus and system for designing a laminate part comprising:

generating a globally optimized 3-D ply definition for a laminate part [initial solution provided by CAE/CAD software as described in section 3, pg. 314, “There are indeed... whole ply of a laminate.”];

optimizing the 3-D ply definition [analysis, Fig. 1, pg. 315];

subsequently generating a feedback signal [responses, Fig. 1, pg. 315; section 4, The Comport architecture, “Design optimization is...an optimization problem.”] providing tow specific information [tow specific information is inherent to the plies when modeled over a non-linear path as supported by applicant’s specification (pg. 2, line 23 – pg. 3, line 3, “Fig. 2 illustrates...any sliding forces.”) and known to those of ordinary skill in the art]; and

modifying the 3-D ply definition responsive to the feedback signal [Fig. 1; section 4, The Comport architecture, “Design optimization is...an optimization problem.”].

12. As for claims 2, 9 and 16, Ref discloses the process, apparatus and system as recited in claims 1, 8 and 15 wherein optimizing step is performed by a structural optimizer [pg. 315, “Another set of drivers....displacements, safety margins.”].
13. As for claims 4, 11 and 18, Ref discloses the process, apparatus and system as recited in claims 2, 9 and 16, wherein the structural optimizer includes a stacking sequence realizer [section 3, Scenario for stacking sequence optimization, pg. 314, “There are indeed...ply of a laminate.”].
14. As for claims 5, 12 and 19 Ref discloses the process, apparatus and system as recited in claims 1, 8 and 15, wherein the optimizing step is performed by a design optimizer module [pg. 315, “Another set of drivers....displacements, safety margins.”].

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15. As for claims 7, 14 and 21, Ref discloses the process, apparatus and system as recited in claims 5, 12 and 19, wherein the structural optimizer includes a stacking sequence realizer [section 3, Scenario for stacking sequence optimization, pg. 314, "There are indeed...ply of a laminate."].
16. **Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, 21** are rejected under 35 U.S.C. 102(b) as being anticipated by Ward et al (US 5,006,990) (hereinafter Ward).
17. As for claims 1, 8 and 15, Ward discloses a composite design optimization process, apparatus and system for designing a laminate part comprising:
- generating a globally optimized 3-D ply definition for a laminate part [initial solution provided by CADAM software, col. 4, lines 48-52, "The interface of SLIC...it for accuracy."];
 - optimizing the 3-D ply definition [col. 2, lines 9-16, "It is another object...of ply material."; col. 2, lines 44-51, "Analysis of the physical...by the system."];
 - subsequently generating a feedback signal [col. 2, lines 37-43, "In the preferred embodiments...operations data requirements."] providing tow specific information [col. 1, lines 41-47, "Thus, each ply of...must be defined..."]; and
 - modifying the 3-D ply definition responsive to the feedback signal [col. 2, lines 56-59, "Because SLIC forces...engineering to manufacturing."].
18. As for claims 2, 9 and 16, Ref discloses the process, apparatus and system as recited in claims 1, 8 and 15 wherein optimizing step is performed by a structural optimizer [col. 2, lines 44-51, "Analysis of the physical...by the system."].

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19. As for claims 4, 11 and 18, Ref discloses the process, apparatus and system as recited in claims 2, 9 and 16, wherein the structural optimizer includes a stacking sequence realizer [col. 1, lines 47-52, "the position of...2,000 unique plies."; col. 1, lines 62-65, "It is an object...of a composite part."].
20. As for claims 5, 12 and 19 Ref discloses the process, apparatus and system as recited in claims 1, 8 and 15, wherein the optimizing step is performed by a design optimizer module [col. 2, lines 37-43, "In the preferred embodiments...operations data requirements."].
21. As for claims 7, 14 and 21, Ref discloses the process, apparatus and system as recited in claims 5, 12 and 19, wherein the structural optimizer includes a stacking sequence realizer [col. 1, lines 47-52, "the position of...2,000 unique plies."; col. 1, lines 62-65, "It is an object...of a composite part."].

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
23. **Claims 3, 6, 10, 13, 17, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward in view of Moreton (US 5,636,338).
24. As for claims 3, 6, 10, 13, 17, and 20 and Ward does not specifically disclose the use of a lagrange optimizer. However, Moreton discloses the use of lagrange optimization in computer modeling of curves and surfaces [col. 16, lines 39-43, "Exact G continuity...in the functional."]. It would have been obvious to one of ordinary skill in the art to modify the

teachings of Ward such that the structural optimizer includes a lagrange optimizer module in order to ensure surface continuity subject to geometric constraints, as taught by Moreton [col. 16, lines 29-48, "Based on the MVN...being tangent continuous."].

25. **Claims 3, 6, 10, 13, 17, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Morelle in view of Moreton (US 5,636,338).

26. As for claims 3, 6, 10, 13, 17, and 20 and Morelle does not specifically disclose the use of a lagrange optimizer. However, Moreton discloses the use of lagrange optimization in computer modeling of curves and surfaces [col. 16, lines 39-43, "Exact G continuity...in the functional."]. It would have been obvious to one of ordinary skill in the art to modify the teachings of Morelle such that the structural optimizer includes a lagrange optimizer module in order to ensure surface continuity subject to geometric constraints, as taught by Moreton [col. 16, lines 29-48, "Based on the MVN...being tangent continuous."].

Conclusion


27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5,038,291, note Fig. 4; Chris Waldhart, "Analysis of Tow-Placed, Variable-Stiffness Laminates," Master's Thesis, Virginia Polytechnic Institute, June 5, 1996, note pgs. 1-35; Brian Tatting and Zafer Gurdal, "Design and Manufacture of Tow-placed Variable Stiffness Composite Laminates with Manufacturing Considerations," 13th US National Congress of Applied Mechanics, June 25, 1998; US 5,419,231, note background; US 6,490,496, note method for laminated object manufacturing; US 5,963,861, note Fig. 4; US 5,984,511, note Fig. 1; US 5,729,463, note Fig. 2.

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28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron C Perez-Daple whose telephone number is (703)305-4897. The examiner can normally be reached on 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri can be reached on (703)305-0282. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

 10/16/03

Aaron Perez-Daple


RAMESH PATEL
PRIMARY EXAMINER
10/17/03
For Anil Khatri